Roll No. ....

Total No. of Questions : 09]

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Paper ID [A0329]

(Please fill this Paper ID in OMR Sheet)

B.Tech. (Sem. - 8th)

OPTICAL FIBER COMMUNICATIONS (EC - 404)

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

1) Section - A is **Compulsory.**

2) Attempt any **Four** questions from Section - B.

3) Attempt any **Two** questions from Section - C.

Section - A

Q1)

(10 × 2 = 20)

a) List some factors which determine the need for fiber optic communication.

b) Explain the refractive index profile for step index fibers.

c) Explain the difference between group velocity and phase velocity.

d) What is Rayleigh Scattering?

e) Briefly discuss the principle of LASER.

f) What are the important characteristics which are needed for photo detector.

g) Explain the difference between long haul communication with its counter part.

h) Briefly discuss the principle of WDM.

i) What do you understand by Bit Error Rate? What is its importance and how it is measured?

j) What is meant by spectral line width?

Section - B

(4 × 5 = 20)

Q2) A point source of light is 12cm below the surface of a large body of water (n = 1.33 for water). What is the radius of the largest circle on the water surface through which the light can emerge?

Q3) Describe the various design issues for the fabrication of optical fibers.

Q4) Discuss the principle of DFB lasers.

Q5) An optical transmission system is constrained to have 500 GHz channel spacing. How many wavelength channels can be utilized in the 1536-to-1556 nm spectral band?

Q6) Discuss the various factors which lead to pulse broadening.

Section - C

(2 × 10 = 20)

Q7) Assume we have an EDFA power amplifier that produces $P_{s, out}$ = maximum output power = 27 dBm for an input level of 2dBm at 1542 nm.

(a) Find the amplifier gain.

(b) What is the minimum pump power required.

Q8) What are dispersion shifted fibers? Describe the principle working and important characteristics?

Q9) Write short notes on the following :

(a) Sources of power penalty.

(b) Fiber losses.

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